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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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CHRISTENSEN, O'CONNOR, JOHNSON, KINDNESS, PLLC
1420 FIFTH AVENUE
SUITE 2800
SEATTLE, WA 98101-2347

EXAMINER

PHINNEY, JASON R

ART UNIT PAPER NUMBER

2879

DATE MAILED: 10/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/067,625

Applicant(s)

HWU ET AL.

Examiner

Jason Phinney

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 May 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) 13-17 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 and 18-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 February 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-12 and 18-22, drawn to an electron emissive device, classified in class 313, subclass 293.
 - II. Claims 13-17, drawn to a method of manufacture, classified in class 445, subclass 24.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions II and I are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product as claimed may be made by the materially different process of forming the substrate by molding or extrusion without the need to etch.
3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.
4. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art because of their recognized divergent subject matter, restriction for examination purposes as indicated is proper.
5. During a telephone conversation with Scott Shigeta on 9/11/03 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-12 and 18-22. Affirmation

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of this election must be made by applicant in replying to this Office action. Claims 13-17 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

6. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 1-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

9. Claim 1 recites "a cathode positioned the opening of said cavity" in line 5. The Examiner believes that this was intended to read "a cathode positioned **over** the opening of said cavity" as shown in the Applicant's Figure 1, and has treated it as such for the purposes of examination.

10. Regarding Claims 2-12, Claims 2-12 are rejected as being indefinite due to their dependency status upon rejected Claim 1.

11. Claims 18-22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

12. Claim 18 recites the limitation "the grid" in line 9. There is insufficient antecedent basis for this limitation in the claim.

13. Regarding Claims 19-22, Claims 19-22 are rejected as being indefinite due to their dependency status upon rejected Claim 18.

Claim Rejections - 35 USC § 102

14. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

15. Claims 1-3, 7, 9, 11, 12, 18-20, and 22 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by U.S. Patent No. 5,598,052 to Khan.

Regarding Claim 1, Khan discloses a device, comprising a substrate (Figure 13, #430) having a cavity (#444) that extends into the substrate, the cavity having an opening on at least one surface of the substrate (See Figure 13f); an anode (#434) positioned within the cavity of the substrate; a cathode (#404) positioned over the opening of the cavity (See Figure 13f), wherein the anode receives electrons emitted by the cathode, and wherein the anode produces an electrical current to an external source in response to receiving the electrons; a first grid (#412)

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having at least one aperture (#'s 416 and 418) to allow the passage of electrons therethrough, wherein the first grid is constructed of an electrically conductive material, and wherein the aperture of the first grid is positioned between the cathode and anode (See Figure 13f); a seal for creating a controlled environment in an area surrounding the first grid, cathode and anode, wherein the controlled environment allows for electron flow between the cathode, first grid and anode (Column 13, Line 60 – Column 14, Line 7); a circuit for heating the cathode (Column 4, Lines 50-58), and a control circuit for controlling the magnitude of the flow of electrons through the aperture of the first grid (Column 14, Lines 8-26), thereby controlling the electrical current produced by the anode.

Regarding Claim 2, Khan, in Figure 13f, depicts the grid as being mounted on the cathode rather than the anode as claimed however Khan also discloses that the location of the cathode and the anode may be switched (Column 14, Lines 50-52).

Regarding Claim 3, Khan further discloses that the first grid should be configured with a plurality of apertures (#'s 416 and 418) sized to allow the first grid to control the flow of electrons from the cathode to the anode when a control voltage is applied to the first grid (Column 13, Lines 20-27).

Regarding Claim 7, Kahn further discloses that the cathode may comprise an electron emitting coating disposed thereon (Column 13, Lines 6-8).

Regarding Claim 9, Kahn further discloses that the distance between the anode and cathode may fall between 0.5 microns and 2 millimeters (see Column 3, Lines 36-42 which discloses that an appropriate spacing could be 100 microns which falls within the range claimed).

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Regarding Claim 11, Kahn further discloses that the controlled environment is an enclosed area surrounding the grid, cathode, and anode, wherein the enclosed area has a vacuum drawn therein (See Figure 13 and Column 13, Lines 60-61).

Regarding Claim 12, Kahn further discloses that the controlled environment should be an enclosed area filled with a gas selected from the group consisting of hydrogen, helium, argon, and mercury (Column 11, Lines 19-22).

Regarding Claim 18, Khan discloses a device comprising: a substrate (#430) having a cavity (#444) that extends into the substrate; an anode (#434) constructed of an electrically conductive material, wherein the anode is positioned in the cavity of the substrate; cathode (#404) positioned over the cavity of the substrate (See Figure 13f), wherein the anode is configured to receive electrons emitted by the cathode, and wherein the anode is configured to produce an electrical current to an external source in response to receiving the electrons; a grid (#412); a seal for creating a controlled environment in an area surrounding the grid, cathode and anode (Column 13, Line 60 – Column 14, Line 7); and a circuit configured for heating the cathode (Column 4, Lines 50-58).

Regarding Claim 19, Kahn further discloses that the cathode should be attached to the substrate to create a vacuum environment in an area surrounding the anode, cathode and grid (See Figure 13 and Column 13, Lines 60-61).

Regarding Claim 20, Kahn further discloses that the cathode should contain an electron emitting coating disposed thereon (Column 13, Lines 6-8).

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Regarding Claim 22, Kahn further discloses that the space between the anode and cathode may fall between 0.5 microns and 2 millimeters (see Column 3, Lines 36-42 which discloses that an appropriate spacing could be 100 microns which falls within the range claimed).

Claim Rejections - 35 USC § 103

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

17. Claims 4-6, 8, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,598,052 to Khan in view of U.S. Patent No. 5,686,790 to Curtin.

Khan discloses the device of Claims 1, 7, 18 and 20 as described above.

Regarding Claim 4, Kahn fails to exemplify that there should also be a second grid having a plurality of apertures configured for allowing the passage of electrons therethrough, wherein the aperture of the second grid is positioned between the cathode and anode, and wherein the second grid controls the flow of electrons from the cathode to the anode when a control voltage is applied to the second grid.

Regarding Claim 5, Kahn fails to exemplify that the plurality of apertures of the second grid should be aligned with the plurality of apertures of the first grid.

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Regarding Claim 6, Kahn discloses that the cathode should be attached to the substrate to create a vacuum environment in an area surrounding the grids, anode and cathode (See Figure 13 and Column 13, Lines 60-61).

Curtin in an alternate device teaches that a second grid should be positioned on the first grid such that the plurality of apertures of the second grid are aligned with the plurality of apertures of the first grid to allow the passage of electrons therethrough in order to further limit the passage of electrons that are not directed toward the intended location (See Figure 2B, # 207a which is the multi-layered grid).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to use multiple grids as taught by Curtin in the device of Kahn in order to better limit the passage of electrons that are not directed toward the intended location.

Regarding Claim 8, Kahn fails to exemplify that the electron emitting coating should comprise a metal tricarbonates.

Regarding Claim 21, Kahn fails to exemplify that the electron emitting coating should be made of a tricarbonates.

Curtin in an alternate device teaches that metal tricarbonates are commonly used to coat cathodes in order to improve their electron emissive properties (Column 15, Lines 39-45).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to coat the cathode of Khan with the metal tricarbonates taught by Curtin in order to improve their electron emissive properties.

18. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,598,052 to Khan in view of U.S. Patent No. 6,465,132 to Jin.

Khan discloses the device of Claim 1 as described above.

Khan fails to exemplify that the desired material choice for use in the grid is tungsten, gold, or tantalum, instead merely stating that it should be a metal.

Jin teaches that highly conductive metals such as tungsten should be used to better control the direction of the emitted electrons (Column 12, Lines 30-35).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to use the grid material taught by Jin in the device of Khan to better control the direction of the emitted electrons.

Conclusion

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason Phinney whose telephone number is (703) 305-3999. The examiner can normally be reached on M-F 7:30-4:00.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel can be reached on (703) 305-4794. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

JP



Joseph Williams
Joseph Williams